#7

INSTRUCTION MANUAL

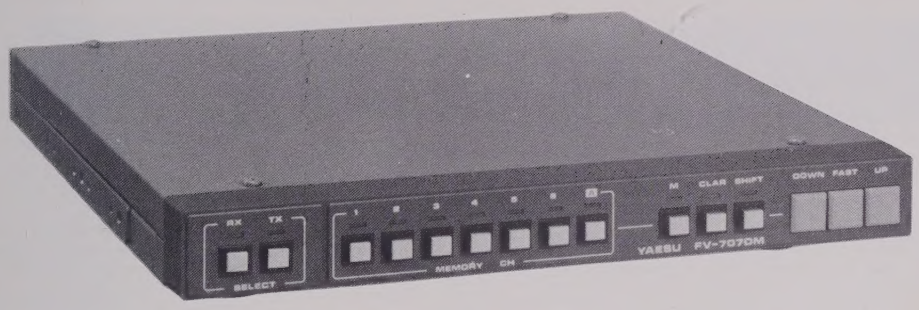
FV-707DM

JERRY

YAESU MUSEN CO., LTD.

TOKYO JAPAN

YAESU
DIGITAL VFO
FV-707DM



GENERAL

The FV-707DM is a highly sophisticated digitally synthesized external VFO for the FT-707 transceiver. Featuring a dual loop PLL system which provides up/down scanning in 10 Hz steps, the FV-707DM includes clarifier and memory shift circuits which allow unlimited offset from VFO or memory channels within the normal 500 kHz working range of the VFO. As many as twelve memory channels may be programmed.

Scanning controls on the optional YM-35 microphone for the FT-707 allow fingertip frequency control of the operating frequency when using the FV-707DM. When using the scanning controls on SSB or CW, the 10 Hz channel steps are not discernible, so the sound you hear as you sweep the band sounds just like a regular analog VFO.

A product of the most modern solid state technology, the FV-707DM stands only slightly more than an inch tall (27 mm). It is designed for mounting beneath the FT-707 transceiver, providing a synthesized communications module considerably smaller than most transceivers on the market today. All power connections are made via the FT-707 transceiver.

We recommend that you read this manual in its entirety, so as to become better acquainted with the exciting new FV-707DM. With proper care in operation, this equipment will provide many years of reliable operation.

SPECIFICATIONS

Output frequency:
4.9–5.6 MHz

Output level:
150 mV rms at 50 ohms

Output impedance:
50 ohms

Frequency stability:
±75 Hz from switch-on (0° – 50°C)

Memory channels:
12

Power requirements:
13.5 VDC, negative ground (supplied by FT-707)

Current consumption:
0.5 amps maximum

Case size:
27(H) x 238(W) x 235(D) mm

Weight:
Approx. 1.6 kg

SEMICONDUCTORS

Transistors:

2SC535A	9
2SC945	1
2SC1815GR	1
MPS-A13	2

FETs:

2SK19TM-GR	9
3SK73GR	3

Diodes:

1N270 (Ge)	4
10D1 (Si)	1
1S1555 (Si)	6
MV-104 (Varactor)	2

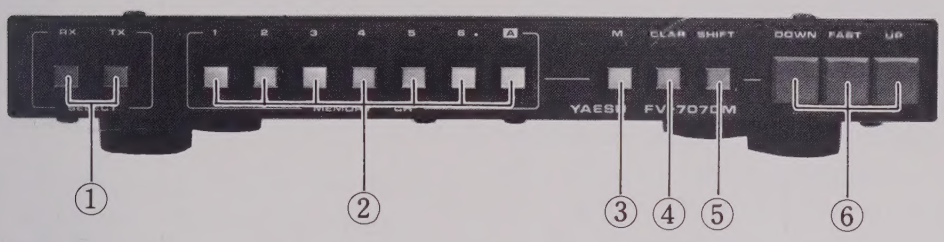
LEDs:

TLR-205	5
TLG-205	6
TLY-205	1

ICs:

78L08	2
TC5081P	2
TC9122P	2
μPB551C	2
μPC14305	2
μPD5101LC	5
MM74C00	1
MM74C90	1
MSM4011	1
MC14001B	1
MC14008B	1
MC14011B	2
MC14016B	2
MC14025B	1
MC14093B	1
MC14510B	10
MC14518B	2
MC14519B	5
SN76514N	4
SN74LS90N	2
SN74LS123N	1
SN74LS192N	5
SN74LS390N	1

FRONT PANEL CONTROLS AND SWITCHES



(1) SELECT switches

RX — Push this button to select FV-707DM control of the receive frequency. Transmit frequency control will remain on the FT-707 main dial or fixed channel.

TX — Push this button to select FV-707DM control of the transmit frequency. Receive frequency control will remain on the FT-707 main dial or fixed channel.

RX/TX — Push both buttons to select FV-707DM control of the transceive frequency.

(2) MEMORY CHANNEL switches

These switches select the memory channel in use. Push switches 1 through 6 to select the desired channel. By pushing switch A, switches 1 through 6 become channels 7 through 12. See the section on operation for details.

(3) M

Push this switch to store a frequency in memory.

(4) CLAR

The Clarifier switch allows offset of the receive frequency from any memory channel previously stored (and recalled by appropriate selection of the memory channel switches). Offset is in 10 Hz synthesized steps, and the UP, DOWN, and FAST switches allow selection of the direction and speed of the scan.

(5) SHIFT

In the same manner as the CLAR switch, the SHIFT switch allows offset of the transceive (TX and RX) frequency from any memory channel frequency. The UP, DOWN, and FAST switches are again used.

(6) DOWN/FAST/UP

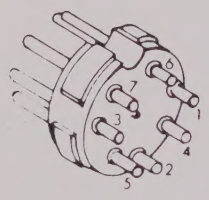
When the desired selection of the CLAR or SHIFT switch has been made, push the DOWN switch to scan lower in frequency, and push the UP switch to scan higher in frequency. Push the FAST switch for fast scanning. The scan rate is 10 kHz per second during fast scan, 1 kHz per second during normal scan.

INSTALLATION

When you first open the packing carton, inspect the VFO for any visible signs of damage. If any damage is present, notify the shipping company immediately, and document the damage completely. Save the packing material for possible use at a later date.

The FV-707DM is designed for installation beneath the FT-707 transceiver. The space between the two units allows free circulation of air, but it must not be obstructed by papers or other material placed between the two units. For mobile installations, the special MMB-2 mobile mounting bracket may be used to mount the transceiver and the FV-707DM together. See your Yaesu dealer for details.

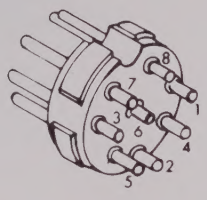
The only interconnections required are to connect the 7 pin DIN plug from the FV-707DM to the FT-707ACC socket, and the 8 pin DIN plug from the FV-707DM should be connected to the FT-707 EXT VFO socket. All power and switching connections are accomplished by these two cables. Be certain that the FT-707 power switch is OFF when making interconnections.



PIN No.

1 FAST CONT(MIC)
2 DOWN CONT(MIC)
3 E
4 PTT
5 UP CONT(MIC)
6 TX 13.5V
7 PATCH MIC IN

ACC Plug

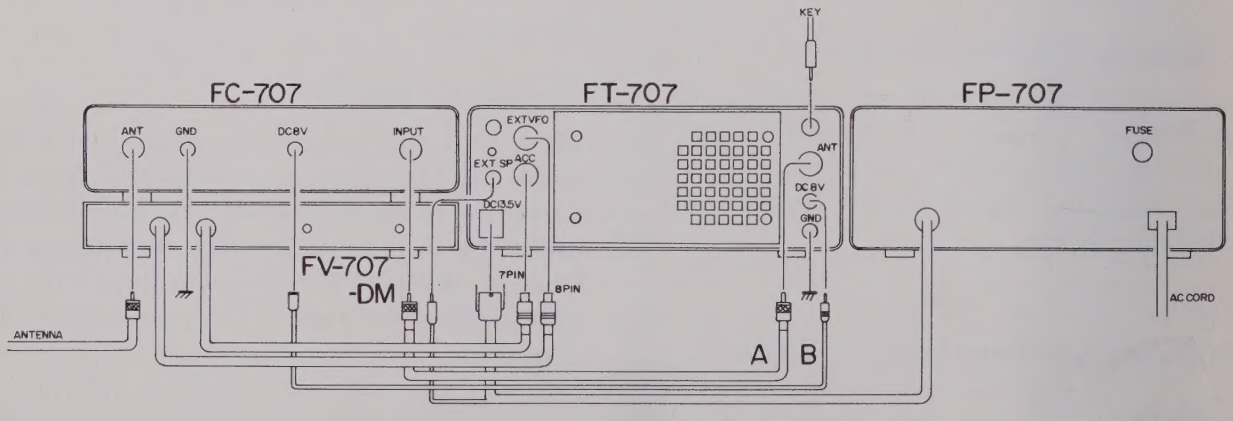


PIN No.

1 E
2 TX 8V
3 E
4 8V
5 VFO FIX 8V
6 13.5V
7 EXT VFO IN
8 MEMORY OUT

EXT VFO Plug

INTERCONNECTIONS



OPERATION

(1) Preset the controls and switches as follows:

SELECT switches	RX/TX both OFF (button not pushed)
MEMORY CH	Push channel 1
M	OFF (button not pushed)
CLAR	OFF (button not pushed)
SHIFT	OFF (button not pushed)

(2) Turn the FT-707 POWER switch ON. The FV-707DM CH 1 LED will become illuminated.

(3) Rotate the FT-707 main tuning dial to a frequency you want to store in memory. Now press the M button to store that frequency into memory channel 1.

(4) In like fashion, other frequencies may be stored in memory channels 2 through 6 by pressing the appropriate memory channel button. To store frequencies in memory channels 7 through 12, press the memory channel A button and one of the memory 1–6 buttons. For example, for memory channel 7 push the channel A and the channel 1 buttons; for channel 8, push the channel A and the channel 2 buttons, etc.

(5) Once a frequency is stored in memory, it may be recalled by pushing one or both of the SELECT switches. To recall a frequency for control on receive only, push the RX button (transmit frequency control will remain on the FT-707 main dial). To recall a frequency for control on transmit only, push the TX button (receive frequency control will remain on the FT-707 main dial. To use the FV-707DM to control both the transmit and receive frequencies, push both the TX and RX buttons.

(6) Note that if you are using memory channel 2, and you want to select memory channel 8, the only switching that you need to do is to push the memory channel A switch.

CLARIFIER OPERATION

The Clarifier feature allows offset of the receive frequency from memory channels. This feature is very useful for following drifting stations, or for setting a particular CW station to your favorite beat note. The Clarifier will not affect the transmit frequency.

(1) Push the CLAR switch to activate the Clarifier. The CLAR LED will become illuminated.

(2) To move higher in frequency, push the FV-707DM UP switch. The synthesizer will scan in 10 Hz steps at a rate of 1 kHz per second. Release the UP switch to stop the scan.

(3) To move lower in frequency, use the same procedure, but push the DOWN switch.

(4) To increase the scan speed, push both the UP or DOWN buttons and the FAST button. The scanning rate will now be 10 kHz per second.

(5) Do not attempt to scan outside of the 500 kHz VFO range. If you do, the PLL will eventually unlock, and the memory will have to be reset. Turn the CLAR switch off in the case of PLL unlock.

(6) The Clarifier feature shifts all memory channels at the same time. Therefore, some cautions should be observed, as can be seen from the following example: let us say that 14.1000 MHz is stored in memory channel 1, and 14.250 MHz is stored in memory channel 5. If you push the RX select switch, the CLAR button, and the channel 5 button, and then scan upward 50 kHz, the receive frequency will become 14.3000 MHz. However, if you push the channel 1 button, you will not return to 14.1000 MHz, but to 14.1500 MHz, because of the shift feature. Switch the Clarifier OFF to return to 14.1000 MHz. See the practical examples to follow to learn how to use the parallel memory shifting feature to good advantage.

(7) When you switch the CLAR switch OFF, then ON again, the Clarifier will reset to the original frequency (the frequency originally stored in memory). Please see the practical examples for details on how to hold a shifted frequency in memory.

MEMORY SHIFT OPERATION

To move the transceive frequency (both TX and RX frequencies) off of memory channels, use the SHIFT button. Operation is identical to that of the Clarifier system, as can be seen from the discussion to follow.

(1) Once a frequency is stored in memory, push the TX and RX select switches to set up the FV-707DM for control of the transceive frequency on the memorized channel. Now push the SHIFT button.

(2) With the SHIFT button activated, all frequency control will be via the memory channel switch and the UP, DOWN, and FAST controls. Push the UP switch to scan higher in frequency at a rate of 1 kHz per second. Push the DOWN switch to scan lower in frequency at 1 kHz per second. Push both the UP or DOWN button and the FAST button to increase the scanning speed to 10 kHz per second.

(3) Note that if you push only the RX select switch, the transmit frequency will not be affected by the SHIFT control, because transmit frequency control will be exercised via the FT-707 main dial.

(4) If, when a frequency is initially recalled from memory by pushing the TX and RX buttons, you then push both the CLAR and SHIFT buttons, the CLAR button will have priority. That is, when both CLAR and SHIFT are pressed, only the receive frequency will be changed by the UP or DOWN switch.

(5) If you are using the SHIFT button, and then press additionally the CLAR button, the transmit frequency will be fixed on the frequency being occupied when the CLAR button was pushed; the receive frequency will then be varied in accordance with the commands of the UP and DOWN switches.

For example, store 7.0050 kHz in memory channel 1, and press the TX and RX buttons. Now press the SHIFT button, and press the UP switch so as to move the operating frequency to 7.0100 MHz. Now close the PTT switch briefly to see that both the transmit and receive frequencies are 7.0100 MHz. Now press the CLAR switch, and press the UP switch so as to obtain a reading of 7.0150 MHz on the FT-707 digital display. This is the new receive frequency; press the PTT, and you will see that the transmit frequency is still 7.0100 MHz, the frequency on which you were operating when the CLAR button was pushed.

PRACTICAL OPERATING EXAMPLES

(1) You are operating on 20 meter SSB, with a favorite operating frequency of 14.225 MHz. Begin your operating by pressing the memory channel 1 button, rotating the FT-707 main dial to 14.225 MHz, and pressing M. Now press the TX and RX buttons for transceive frequency control on the FV-707DM, memory channel 1.

To sweep the band looking for other stations, just press the SHIFT button and the UP or DOWN button. For instant return to 14.225 MHz, press the SHIFT button to turn the memory shift off. To start another sweep of the band, turn the memory shift on again; the starting point for your sweep will have automatically been reset to 14.225 MHz.

(2) You hear DX1DX on 7.090 MHz, listening on 7.225 MHz for calls. Use the memory on receive to handle this situation with ease.

Rotate the FT-707 main dial to 7.090 MHz. Press the desired memory channel button, and press M. Now rotate the FT-707 main dial to 7.225 MHz to locate the pile-up of stations calling DX1DX. Press the FT-707DM RX button. You will now be transmitting on 7.225 MHz, and receiving on 7.090 MHz. If DX1DX starts to drift, press the FT-707DM

CLAR (or SHIFT) button, and activate the UP or DOWN button as needed to follow the unstable DX1DX signal. To check 7.225 MHz, your transmitting frequency, press the FV-707DM RX button again (to return RX frequency control to the FT-707 main dial).

(3) You find DX1DX on 21.270 MHz, working stations by order of call area. You also find DXØAA on 14.145 MHz, listening on 14.205 MHz for calls. The memory and no tune-up capability make this situation easy to cover.

First, tune to 21.270 MHz on the FT-707 main dial, push the memory 1 button, and press M. Now, set the band switch to 14 MHz, the FT-707 main dial to 14.145 MHz, push the memory channel 2 button, and press M. Now move the transceiver main dial to 14.205 MHz.

To check DXØAA's frequency (14.145 MHz), press the M2 button and the RX button. To check DX1DX's frequency (21.270 MHz), set the bandswitch to 21 MHz and press the M1 button. To call DX1DX (remember that he is listening on his own frequency), press the TX button. Both the TX and RX LEDs will be illuminated, and you will be transceive on 21.270 MHz. To call DXØAA, push the TX button again (turning it off), push the M2 button, and set the bandswitch to 14 MHz. You will be receiving on 14.145 MHz (M2 frequency) and transmitting on 14.205 MHz (FT-707 dial frequency).

Because there is no "preselector tuning" control, nor any transmitter peaking whatsoever, it may be seen that several stations on different bands may be checked in a matter of seconds, without touching a VFO dial. The next example will further demonstrate the versatility of the FV-707DM memory system.

(4) Let us say you are operating on 28 MHz SSB, and hear several stations you would like to work. To hold them in memory, one need not touch the FT-707 main dial, once a starting frequency is memorized.

Begin your operation on 28.500 MHz by setting the FT-707 main dial to 28.500 MHz, pressing the memory 1 button and pressing M. Now press the RX and TX buttons to put full frequency control on the remote VFO.

Now press the SHIFT button, and the UP button, and begin scanning for desired stations. If one is encountered at 28.520 MHz, press the M2 button and M. Continue scanning, if you wish: if you find a station on 28.545 MHz, press the M3 button and M. Continue this process until the desired stations have all been stored in memory. Now press the SHIFT button again, turning it off.

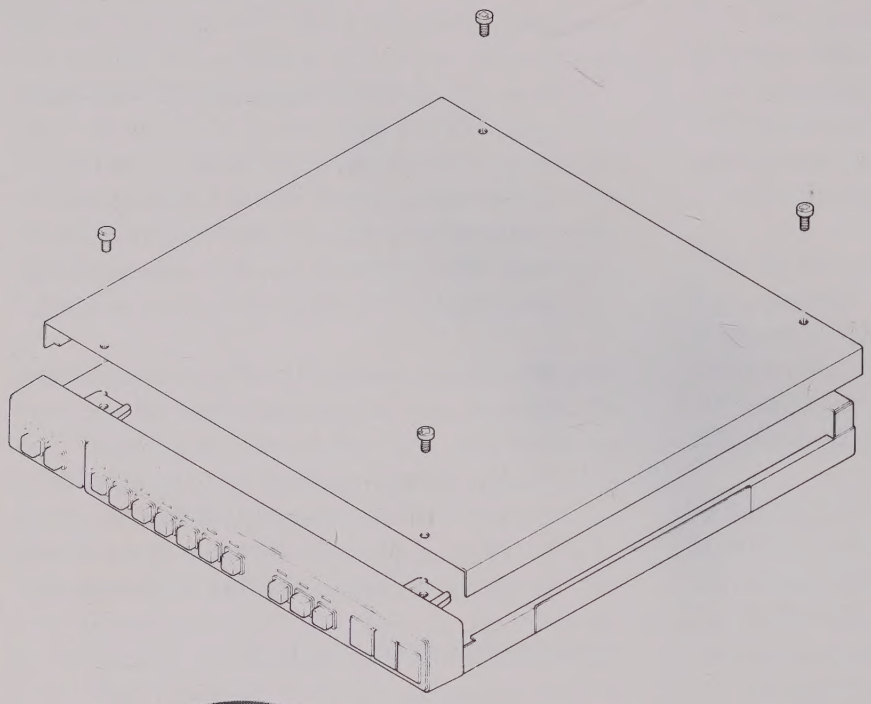
When you press the M1, M2, or other memory buttons, the frequencies stored as you were sweeping the band will be recalled. This parallel memory shift is not found in other memory offset systems, and the added flexibility it provides means you have seconds to spare while others are busy twisting dials.

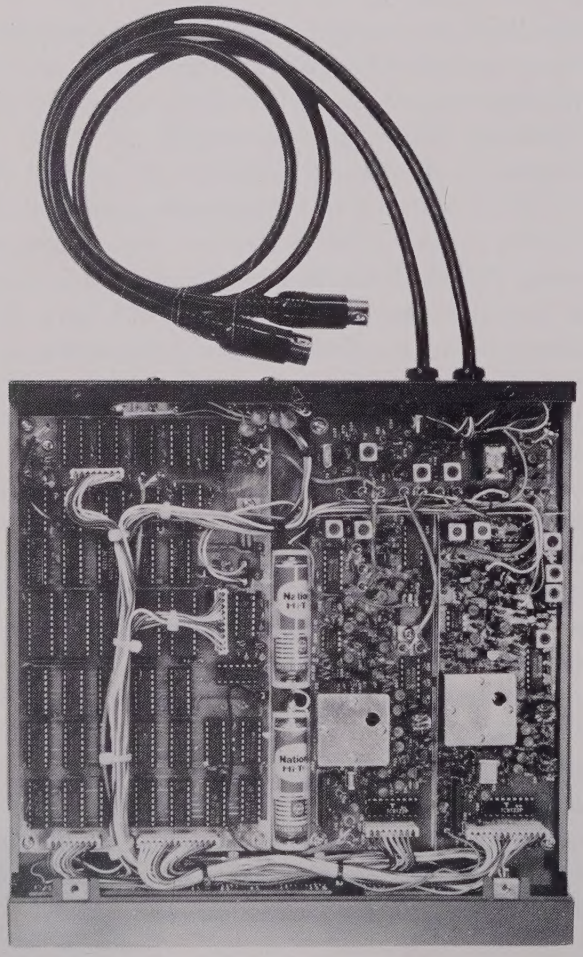
MEMORY BACKUP FEATURE

Provision for memory backup is a convenient feature of your FV-707DM. The memory backup requires two AA size penlight cells (batteries optional). These may be installed as shown in Figure 1. Be absolutely certain to observe the correct polarity of the batteries during installation. Battery consumption is very low, but we recommend that the batteries be replaced once per year. If you have not used the FV-707DM for a long time, check the batteries to ensure that leakage has not started from the batteries. Damage caused by battery leakage or improper polarity of the batteries is not covered by our warranty.

When the batteries are installed, the memory backup feature is always activated. However, you should exercise caution when turning the set off, so as not to cause inadvertant loss of memory. If you are using the SHIFT or CLAR controls, these should both be turned OFF before turning the FT-707/FV-707DM off. If you do not, the microprocessor circuitry could be placed in a random state when the sets are turned on again, with a corresponding loss of memory. If the SHIFT and CLAR switches are both OFF when the sets are turned off, there will be no problem.

If you want to store a frequency in memory that you are using during SHIFT or CLAR operation, store it in memory and then turn the SHIFT and CLAR switches off. The parallel memory system used makes this easy, as described earlier.





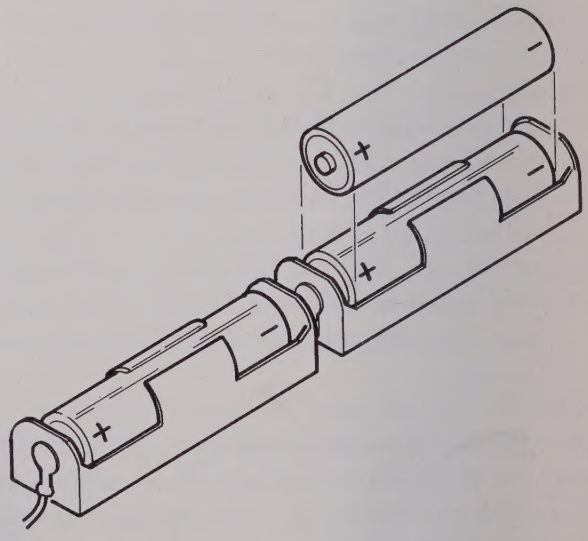
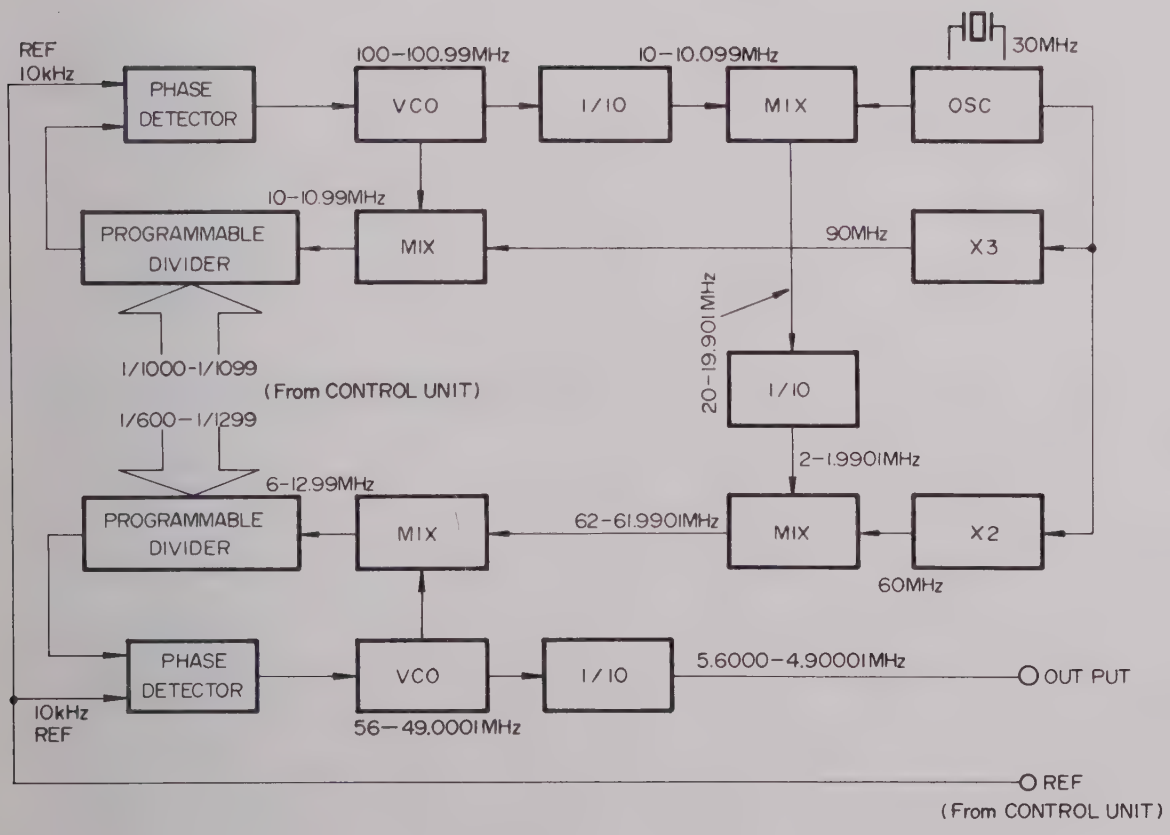


Figure 1


REF
10kHz
PHASE DETECTOR
100–100.99MHz
VCO
1/10
10–10.099MHz
MIX
OSC
30MHz
10–10.99MHz
PROGRAMMABLE DIVIDER
MIX
90MHz
X3
1/1000-1/1099
(From CONTROL UNIT)
20–19.9901MHz
1/10
1/600–1/1299
2–1.9901MHz
6–12.99MHz
PROGRAMMABLE DIVIDER
MIX
62–61.9901MHz
MIX
X2
60MHz
PHASE DETECTOR
VCO
1/10
5.6000–4.90001MHz
OUT PUT
10kHz
REF
56–49.0001MHz
REF
(From CONTROL UNIT)

PART LIST

MAIN CHASSIS

Symbol No.	Parts No.	Description
		RESISTOR
R01	J30356150	Wire wound 3W 15Ω
		PLUG
P01,03,05	P1090157	PI051-08F
P02	P1090159	PI051-10F
P04,06	P1090162	PI051-13F
P07	P0090033	E7-701B-02
P08	P0090160	E8-701B-02
		BATTERY CASE
	Q9000082	C-1
		TERMINAL BOARD
	Q6000007	1L3P (2-0-1)
	Q6000011	1L4P (2-0-2)
		CAPACITOR
C01–04	K13170103	Ceramic disk 50WV 0.01μF

CONTROL UNIT

Symbol No.	Parts No.	Description
	C0021230	P.C.B with Components
	F0002123	Printed Circuit Board
		IC, FET & TRANSISTOR
Q1001	G3305351	Transistor 2SC535A
Q1007	G4800730	FET 3SK73GR
Q1031	G1090027	IC MC14001B
Q1039	G1090049	" MC14008B
Q1010,1032	G1090068	" MC14011B
Q1024,1038	G1090124	" MC14016B
Q1025	G1090177	" MC14025B
Q1011	G1090290	" MC14093B
Q1026–1030, 1033–1037	G1090149	" MC14510B
Q1005,1006	G1090108	" MC14518B
Q1040–1044	G1090050	" MC14519B
Q1003	G1090034	" SN74LS90N
Q1009	G1090100	" SN74LS123N
Q1014–1018	G1090019	" SN74LS192N
Q1002	G1090109	" SN74LS390N
Q1012	G1090156	" MM74C00N
Q1004	G1090097	" MM74C90N
Q1008	G1090065	" μPC14305
Q1019–1023	G1090227	" μPD5101LC
Q1013	G1090135	" MSM4011
		DIODE
D1005, 1008–1010	G2090093	1N270
D1007	G2090001	10D1
D1001–1004, 1006,1011	G2015550	1S1555
		RESISTOR
R1001,1006, 1011	J00245101	Carbon film 1/4W VJ 100Ω
R1014,1015	J00245511	" " " " 510Ω
R1004,1010	J00245102	" " " " 1kΩ
R1005,1023	J00245103	" " " " 10kΩ
R1033,1034	J00245103	Carbon film 1/4W VJ 10kΩ
R1003	J00245153	" " " " 15kΩ
R1002,1012, 1013,1021, 1028,1029	J00245333	" " " " 33kΩ
R1007–1009, 1016–1019, 1022, 1024–1027, 1030–1032, 1035–1038	J00245104	" " " " 100kΩ
R1020	J00245155	" " " " 1.5MΩ
		BLOCK RESISTOR
RB1001–1003	J40900016	RA-10KΩ-8A, 10kΩx8
		CAPACITOR
C1011	K00179007	Ceramic disk 50WV SL 30pF
C1001–1010, 1014,1020, 1021, 1023–1025, 1027,1028, 1031–1033	K13179001	" " " 0.01μF
C1015,1016	K50177102	Mylar film " 0.001μF
C1017,1018	K50177222	" " " 0.0022μF
C1022,1026, 1030, 1034–1036	K50177103	" " " 0.01μF
C1012,1019	K70107106	Tantalum 10WV 10μF
C1013	K70127106	" 16WV 10μF
		RECEPTACLE
J1001,1004	P0090136	PI051-08M
J1002	P0090138	PI051-10M
J1003	P0090141	PI051-13M
	Q5000011	Wrapping terminal C

PLL UNIT

Symbol No.	Parts No.	Description
	C0021220	P.C.B with Components
	F0002122	Printed Circuit Board
		IC, FET & TRANSISTOR
Q2028	G1090034	IC SN74LS90N
Q2008,2021, 2025,2029	G1090062	" SN76514N
Q2001,2012	G1090048	" TC5081P
Q2011,2024	G1090247	" TC9122P
Q2006,2018	G1090292	" μPB551C
Q2031	G1090065	" μPC14305
Q2032,2037	G1090080	" 78L08
Q2003,2007, 2009,2010, 2015,2020, 2022,2023, 2035	G3090035	FET 2SK19TM-GR
Q2004,2016	G4800730G	" 3SK73GR

Q2005,2017, 2019,2026, 2027,2030, 2033,2036	G3305351	TR	2SC535A
Q2034	G3309450	"	2SC945
Q2013	G3318150G	"	2SC1815GR
Q2002,2014	G3090005	"	MPS-A13
		DIODE	
D2003	G2015550		1S1555
D2001,2002	G2090043		MV104
		CRYSTAL	
X2001	H0102280	HC-18/U	30MHz
		RESISTOR	
R2008,2013, 2016,2020, 2039,2044, 2047,2053, 2054,2056, 2072,2075, 2076,2080, 2083,2084, 2087–2091	J00245101	Carbon film	1/4W VJ 100Ω
R2004,2032	J00245151	" " " "	150Ω
R2001,2009, 2017,2021, 2026,2040, 2048,2057, 2062,2071, 2079	J00245331	" " " "	330Ω
R2018,2022, 2028,2049, 2050,2058	J00245511	" " " "	510Ω
R2002,2003, 2023,2059, 2064,2066, 2068	J00245102	" " " "	1kΩ
R2030	J00245182	" " " "	1.8kΩ
R2025,2061	J00245222	" " " "	2.2kΩ
R2052	J00245332	" " " "	3.3kΩ
R2033–2035, 2067			
R2015,2027, 2029,2031, 2046,2051, 2070,2074, 2078,2081, 2086	J00245103	" " " "	10kΩ
R2014,2045, 2069,2077	J00245333	" " " "	33kΩ
R2073,2085	J00245563	" " " "	56kΩ
R2005–2007, 2010–2012, 2019,2024, 2036–2038, 2041,2042, 2043,2055, 2060,2063, 2065,2082	J00245104	" " " "	100kΩ
		THERMISTOR	
Th2001,2002	G9090008		31D26

		CAPACITOR
C2021,2061, 2073,2024	K02172020	Ceramic disk 50WV CH 2pF
C2057,2115	K02172050	" " " " 5pF
C2050	K06172050	" " " UJ 5pF
C2053	K02173060	" " " CH 7pF
C2108	K06173060	" " " UJ 6pF
C2004	K06173070	" " " UJ 7pF
C2008	K02173080	" " " CH 8pF
C2005,2012, 2016, 2125,2130, 2139	K02173100	" " " " 10pF
C2033,2035, 2086,2088	K06175150	" " " UJ 15pF
C2096,2099	K06179004	" " " " 20pF
C2006,2007, 2051,2114, 2138	K02179009	" " " CH 22pF
C2020,2052, 2065	K02179012	" " " " 30pF
C2011,2034, 2056,2087	K06179006	" " " UJ 30pF
C2097,2098	K06175390	" " " " 39pF
C2070	K02179015	" " " CH 43pF
C2066,2069	K06175470	" " " UJ 47pF
C2049,2067, 2068	K06175101	" " " " 100pF
C2143,2145, 2150–2170	K10179003	" " " 470pF
C2144	K10179001	" " " 1000pF
C2003,2010, 2013–2015, 2017–2019, 2022–2032, 2036–2040, 2048,2055, 2058–2060, 2062–2064, 2071,2072, 2074–2085, 2089–2093, 2100–2107, 2109–2113, 2116–2123, 2126–2128, 2131–2137, 2140–2142, 2149,2172	K13179001	" " " 0.01μF
C2174,2175	K70127335	Tantalum 16WV 3.3μF
C2002,2009, 2041–2043, 2045,2054, 2094,2095, 2146,2147, 2171	K70107106	Tantalum 10WV 10μF
C2148	K70127106	" 16WV 10μF
C2046,2047	K50177333	Mylar film 50WV 0.033μF
C2001	K54200006	B32560-A1104J 100WV 0.1μF
C2044	K54200001	B32561-A1105J " 1μF
		TRIMMER CAPACITOR
TC2001,2002	K91000028	ECV-1ZW 10x53, 10pF

		INDUCTOR	
L2004,2016	L1190004	FL4HR68K	0.68μH
L2035,2036	L1190007	FL4H1R8K	1.8μH
L2024,2025	L1190014	FL4H100K	10μH
L2008,2009	L1190015	FL5H120K	12μH
L2029–2031	L1190019	FL5H150K	15μH
L2005,2017, 2019–2021	L1190023	FL5H220K	22μH
L2003,2006, 2007,2010, 2011,2015, 2018,2022, 2023,2026, 2027, 2032–2034	L1190020	FL5H151K	150μH
L2001,2012, 2013,2028	L1190017	FL5H102K	1mH
L2002	L0190016		
L2014	L0190017		
		TRANSFORMER	
T2001,2002	L0020209		
T2004	L0020801		
T2005,2006	L0020802		
T2011	L0020803		
T2012	L0020804		
T2008–2010, 2013	L0020805		
T2003	L0020806		
T2007	L0020807		
		RELAY	
RL2001	M1190001	BR211AD009M	
		RECEPTACLE	
J2002	P0090136	PI051-08M	
J2001	P0090141	PI051-13M	
J2003–2012	P1090178	WP-22-1B	
	Q5000011	Wrapping terminal C	

SWITCH A UNIT

Symbol No.	Parts No.	Description
	C0021210	P.C.B with Components
	F0002121	Printed Circuit Board
		DIODE
D3001,3002	G2090137	LED TLR-205
D3003–3008	G2090136	" TLG-205
D3009	G2090134	" TLY-205
		RESISTOR
R3003,3004	J00245331	Carbon film 1/4W VJ 330Ω
R3001,3002	J00245561	" " " " 560Ω
		SWITCH
S3001	N4090031	SUT-91A

SWITCH B UNIT

Symbol No.	Parts No.	Description
	C0021190	P.C.B with Components
	F0002119	Printed Circuit Board

		DIODE
D4001–4003	G2090137	LED TLR-205
		RESISTOR
R4001,4002	J00245561	Carbon film 1/4W VJ 560Ω
		SWITCH
S4001	N4090032	SUT-31A

UP/DOWN SW UNIT

Symbol No.	Parts No.	Description
	C0021200	P.C.B with Components
	F0002120	Printed Circuit Board
		SWITCH
S5001–5003	N4090033	DC-MDP-AG-LG

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